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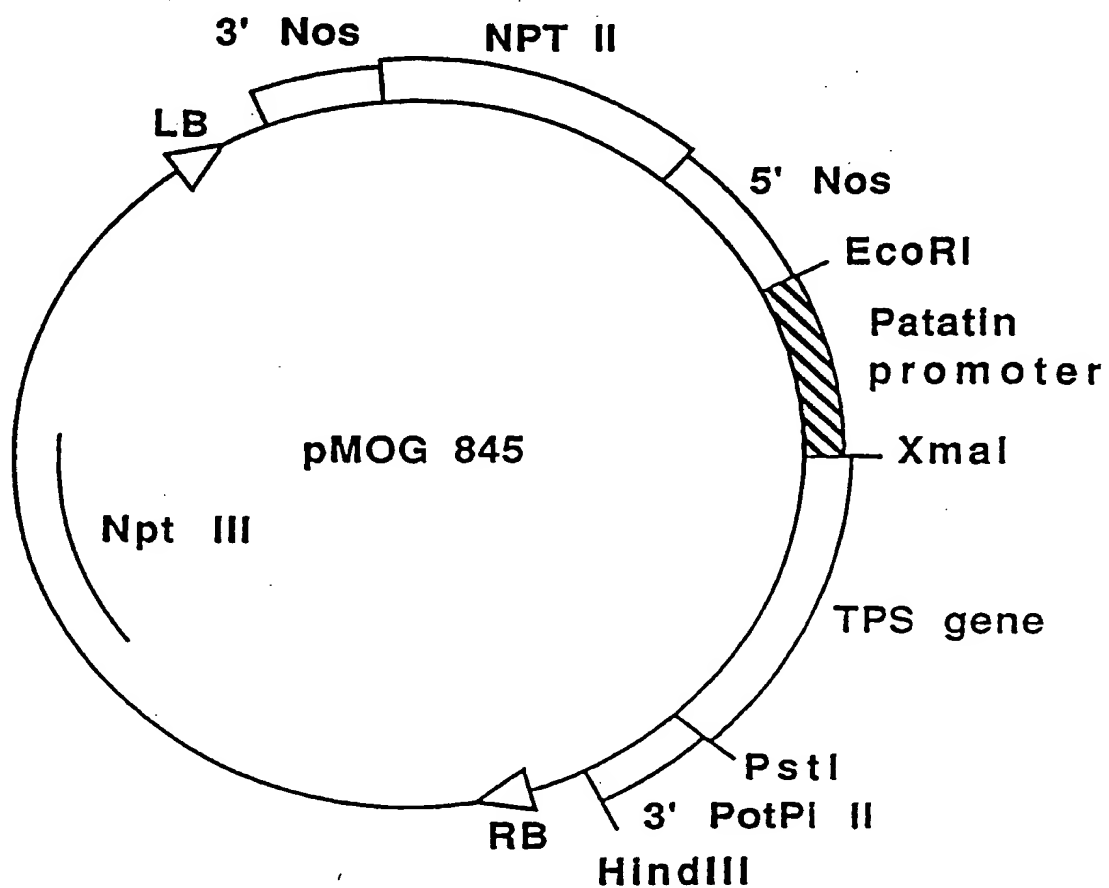


FIG. 1



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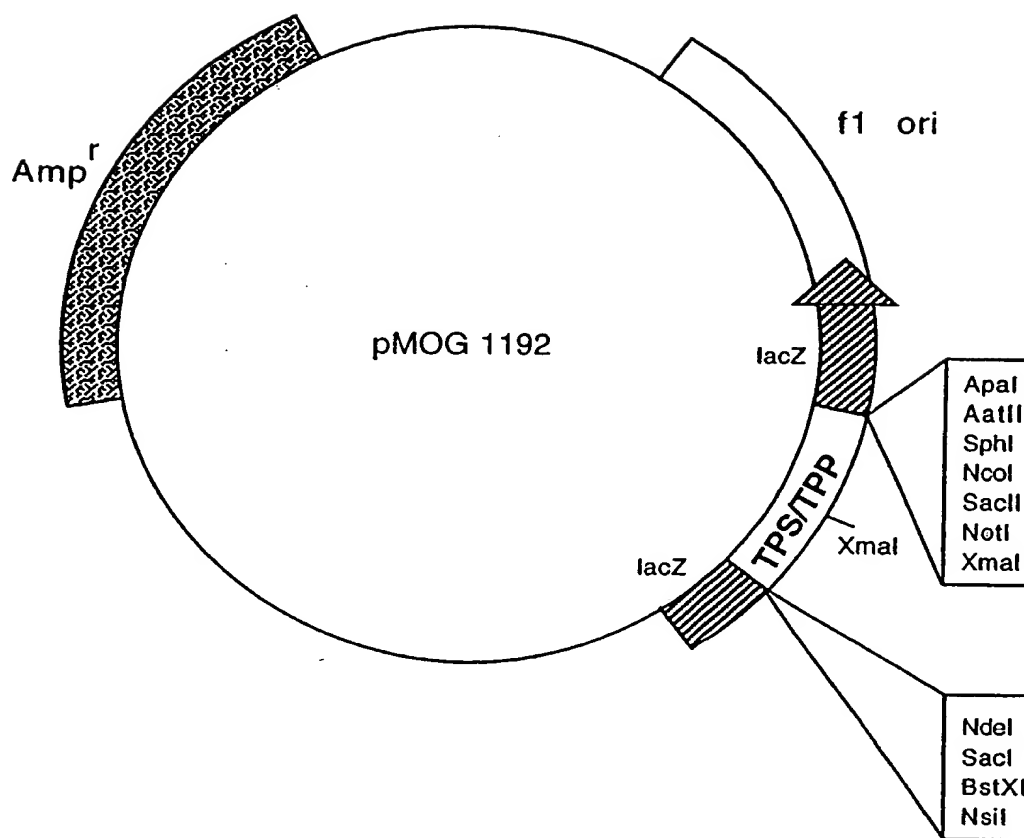


FIG. 2



AA 238
I
Yeast P Y A V P G G R F N E L Y G W D S Y M N A L G L L E A N K T D V A R G M V
Rabbit P F I V P G G R F V E F Y Y W D S Y W V M E G L L L S E M A E T V K G M L
E. coli P Y V V P G G R F R E V Y Y W D S Y F T M L G L A E S G H W D K V A D M V
Silkw. G F I V P G G R F K E I Y Y W D A Y W I I E G L L I T D M T E T A K G M I
Tase25----->
Tase24 ----->
AA
I
Yeast E H F I F E I N H Y G K I L N A N R S Y Y L C R S Q P P F L T E M ...
Rabbit Q N F L D L V T A Y G H I P N G G R V Y Y L Q R S Q P P L L T L M ...
E. coli A N F A H E I D T Y G H I P N G N R S Y Y L S R S Q P P F F A L M ...
Silkw. E N L I E L L Y K F G H I P N G S R W Y Y Q E R S Q P P L L A A M ...
Tase26<-----
AA 644
I
Yeast A A T E G F G W V T N A R Y I L L G L K Y M N ...
Rabbit E V Q E G F G W T N G V A L M L L D ...
E. coli P L Q D G F G W T N G V T L K M L D ...
Silkw. V V Q S G F G W T N G V V L E F I N ...
Tase27<-----

FIG. 3



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Comparison of trehalase sequences derived from different species.

	1				50
Ecoli2trehMLNQKIQN	PNPDELMIEV	DLCYELDPYE	
Ecolitreha	.....	...MKSPAPS	RPQKMALIPA	CIFLCFAALS	
Bommotreha	.....	.....	.....MRLF	LLLVLGLTV.	
Tenmotreha	.....	.....	.....MIPF	LLMVAFADTV	
Rabbitreha	.....	.....	MPGSTWELHL	LLLLGLG...	
Potatotreha	.....	.....	..MGKAIIFM	IFTMSMMIK	
Yeasttreha	MSVFDNVSPF	KKTGFGKIQQ	TRRGSEDDTY	SSSQGNRRFF	IEDVDKTLNE
	51				100
Ecoli2treh	LKLDENIEAE	PEPEMIEGLP	ASDALTPADR	YL.....	.....ELFEH
Ecolitreha	VQAEETPVTP	QPPDILLG..	.....	.....	.....PLFND
Bommotreha	..IADDLPPT	CIRPVY....	.....C	NS.....	.....TLLHY
Tenmotreha	LQVSAQSQPS	CDSKIV....	.....C	QG.....	.....KLLHV
Rabbitreha	LGSEQALPPP	CESQIV....	.....C	HG.....	.....ELLHQ
Potatotreha	AETCKSIDKG	PVIPTT....	.....P	LV.....	.....IFLEK
Yeasttreha	LLAAEDTDKN	YQITIEDTGP	KVLKVGTTANS	YGYKHINIRG	TYMLSNLLQE
	101				150
Ecoli2treh	VQSAKIFP..	....DSKTFP	DCAPKMDPLD	ILIRYRKVRR	HRDF.....D
Ecolitreha	VQNAKLEP..	....DQKTFA	DAVPNSDPLM	ILADYRMQQN	QSGF.....D
Bommotreha	VQMARLYP..	....DSKTFV	DFQMRKDENA	TLQAFQELLD	RTNHNPTKED
Tenmotreha	VEMSRIFN..	....DSKTFV	ELKMINDEQT	TLENFDNFLR	DTNHKRTRAD
Rabbitreha	VQMARLYP..	....DDKQFV	DMPLSTAPDQ	VLQSFALAA	TYNNTVPREQ
Potatotreha	VQEAALQTYG	HKGFDALFV	DMSLRESLSE	TVEAFNKLPR	VVNGSISKSD
Yeasttreha	LTIKASFGRH	QIFLDEARIN	ENPVNRLSRL	INTQF.....	..WNSLTRRVD
	151				200
Ecoli2treh	LRKFVENHFW	L.....	.....P	EVYSSEYVSD	PQN.SLKEHI
Ecolitreha	LRHFVNVNFT	L.....	.....P	KE.GEKYVPP	EGQ.SLREHI
Bommotreha	LQEFVVDFFD	E.TSELEEWK	PDDHK..ENP	P.FLAKIRDQ	GFR.EFAKAL
Tenmotreha	LMKFVSDNFK	Q.ENEFESWT	PTDFT..DNP	T.LLSRIEDK	TIR.QFAQDL
Rabbitreha	LEKFVQEHFQ	AVGQELSWT	PGDWK..ESP	Q.FLQKISDP	KLR.AWAEQL
Potatotreha	LDGFIGSYLS	SPDKDLVYVE	PMDFV..AEP	EGFLPKVKNS	EVR.AWALEV
Yeasttreha	LNNVGEIAKD	TKIDTPGAKN	PRIYVPYDCP	EQYEFYVQAS	QMHPSLKLEV
	201				250
Ecoli2treh	DQLWPVLTRE	PQDHI....P	WSSLLALPQ.	.....	..SYIVPGGR
Ecolitreha	DGLWPVLTRS	TENTE....K	WDSLLPLPE.	.....	..PYVVPGGR
Bommotreha	NDIWPTLARR	VKPSVLEKPE	QSSLVPMTH.	.....	..GFIVPGGR
Tenmotreha	VKIWPTLARK	VKKEVLDPYE	HYSLLPVDN.	.....	..GFIIIPGGR
Rabbitreha	HLLWKKLGKK	IKPEVLSQPE	RFSLIYSQH.	.....	..PFIVPGGR
Potatotreha	HSLWKNLSRK	VADHVLEKPE	LYTLLPLKN.	.....	..PVIIPGSR
Yeasttreha	EYLPKKITAE	YVKSVDNTPG	LLALAMEEHF	NPSTGEKTLI	GYPYAVPGGR
	251				300
Ecoli2treh	FSETYYWDSY	FTMLGLAESC	REDLLKCMAD	NFAWMIENYG	HIPNGNRITY
Ecolitreha	FREVVYWDSY	FTMLGLAESC	HWDKVADMVA	NFAHEIDTYG	HIPNGNRSYY
Bommotreha	FKEIYYWDAY	WIIEGLLITD	MTETAKGMIE	NLIELLYKFG	HIPNGSRWYY
Tenmotreha	FTEFYYWDSY	WIVEGLLLSD	MHETVRGMLD	NFLSIVEKYG	FIPNGARVYY
Rabbitreha	FVEFYYWDSY	WVMEGLLLSE	MAETVKGMLQ	NFLDLVTAYG	HIPNGGRVYY
Potatotreha	FKEVYYWDSY	WVIRGLLASK	MYETAKGIVT	NLVSLIDQFG	YVLNGARAYY
Yeasttreha	FNELYGWDSY	MMALGLLEAN	KTDVARGMVE	HFIFEINHYG	KILNANRSYY

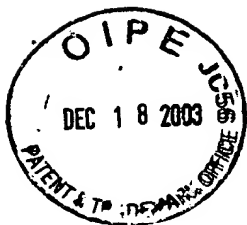
FIG. 4A



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	301			350		
Ecoli2treh	LSRSQPPVFA	LMVELFEEDG	VR.....GA	..RRYLDHLK MEYAFWMDGA		
Ecolitreha	LSRSQPPFFA	LMVELLAQHE	GD.....AA	.LKQYLPQMQ KEYAYWMDGV		
Bommotreha	QERSQPPLLA	AMIKLYYEKT	KD.....IE	FIRKYISALE KELEYWLDT.		
Tenmotreha	LNRSQPPLLT	LMVSLYVSAT	ND.....ME	WLAKNIRTID TELRFWLNN.		
Rabbitreha	LQRSQPPLLT	LMMDRYVAHT	GD.....LA	FLRENIETLA LELDFWAEN.		
Potatotreha	SNRSQPPVLA	TMIVDIFNQT	GD.....LN	LVRRSLPALL KENHFVNSGI		
Yeasttreha	LCRSQPPFLT	EMALVVFKKL	GGRSNPDAVD	LLKRAFQASI KEYKTVWTAS		
	351			400		
Ecoli2treh	ESLIPNQAYR	HVVRMPDGSL	LNRYWDDRDT	PRDESWLEDV ETAK.HSG.R		
Ecolitreha	ENLQAGQOEK	RVVKLQDGT	LNRYWDDRDT	PRPESWVEDI ATAKSNPN.R		
Bommotreha	.HLIA.....	.FNKDDRVT	LLRYIIP	PSAG PRPESYYEDI ELAQKLDKNT		
Tenmotreha	.RLVD.....	.VVKDGIVYK	LAQYNSNSGS	PRPESYYEDV TTASVFSDER		
Rabbitreha	.RTIS.....	.VSSGGSNHT	LNRYHVPYGG	PRPESYSKDT ELAHTLPEG.		
Potatotreha	HKVTI.....	.QDAQGSNHS	LSRYYAMWNK	PRPESSTIDS ETASVLEPNIC		
Yeasttreha	PRL.....	.....DPETG	LSRYHPNGLG	IPPETESDHF DTV.LLPYAS	
	401			450		
Ecoli2treh	PPNEVYRDLR	AGAASGW...	.DYSSRWL...	...RDTGRLA SIRTQFIP.		
Ecolitreha	PATEIYRDLR	SAAASGW...	.DFSSRW...	...DNPQQLN TLRTTSIVP.		
Bommotreha	DPNDIYADLK	SAAESGW...	.DFSTRWFIS	ESGDNSGNLT NLNTKNVIP.		
Tenmotreha	DKAELYMDLK	SAAESGW...	.DFSSRWIVD	EYGGTRGNLS ALHTTRIP.		
Rabbitreha	SWETLWAEK	AGAESGW...	.DFSSRWLVG	..SPNPDSL	SG SIRTSTKLVP.	
Potatotreha	EKRELYRELA	SAAESGW...	.DFSSRW...	...SNGSDLT TTSTTSILP.		
Yeasttreha	KHGVTLDEFK	QLYNDGKIKE	PKLDEFFLHD	RGVRESGHDT TYRFEVGCAY		
	451			500		
Ecoli2treh	...IDLNAFL	FKLESAIANI	SALKGEKE..	.....TE ALFRQKASAR	
Ecolitreha	...VDLNSLM	FKMEKILARA	SKAAGDNA..	.....MA NOYETLANAR	
Bommotreha	...VDLNAIF	AGALQITANF	QAILKNPR..	.....RA AHWGYMAEQW	
Tenmotreha	...VDLNAFL	CQAFQKLSEF	YQTLGDYP..	.....NA TFWSKLVKIW	
Rabbitreha	...VDLNAFL	CQAEELLSGF	YSLGNES..	.....QA TKYRNLRQOR	
Potatotreha	...VDLNAFL	LKMELDIAFL	ANLVGESS..	.....TA SHFTEAAQNR	
Yeasttreha	LATIDLNSLL	YKYEIDIADF	IKEFCDDKYE	DPLDHSITTS AMWKEMAKIR		
	501			550		
Ecoli2treh	RDAVNRYLWD	DENGIYRDYD	WRREQ.....A LFSAAAI	VPL	
Ecolitreha	QKGIEKYLWN	DQGWYADYD	LKSHKV....RN QLTAALF	PPL	
Bommotreha	RSSIEQALWD	EEDGVVHDYD	ILNNK.....PRR YFYTSN	LAPL	
Tenmotreha	QHSIEMVHYN	RDDGIWYDWD	NELSQ.....HRR MFFPSN	FAPL	
Rabbitreha	IAALTALLWD	EDKGAWFDYD	LENQK.....KNH EFYPSN	LTP	
Potatotreha	QKAINCIFWN	AEMGWLDYD	LTNSDTSEDI	YKWEDLHQNK	KSFASNFVPL	
Yeasttreha	QEKITKYMWD	DESGFFFDYN	TKIKH.....RTS YESATT	FWAL	
	551			600		
Ecoli2treh	YVGMANHEQA	DRLANAVRSR	LLT.....P	GG...ILASE	YETGEQWDKP	
Ecolitreha	YVNAAAKDRA	NKMATATKTH	LLQ.....P	GG...LNTTS	VKSGQWDA	P
Bommotreha	WMNAVEKPFL	AKHGARVLEY	LHESQALEYP	GG...VPVSL	VNSGEQWDFP	
Tenmotreha	WSETFDSRNA	EILGEMAAEY	FITQNMMDYH	GG...IPTSL	SHTGEQWDY	P
Rabbitreha	WAGCFSDPAI	A...DKALQY	LQDSQILNHR	HG...IPTSL	QNTGQWDFP	
Potatotreha	WTE.ISCSDN	NITTOQVQY	LMSSGLLQ.P	AG...IAMTL	SNTGQWDFP	
Yeasttreha	WAGLATKEQA	QKMVEKALPK	LEMLGGLAAC	TERS	RGPI	SIRPIROWDY

FIG. 4B



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	601			650
Ecoli2treh	NGWAPLQWMA	IQGFKMYG..	.DDLLGDEIA	RSWLKTVNQF YLE.QHKLIE
Ecolitreha	NGWAPLQWVA	TEGLQNYG..	.QKEVAMDIS	WHFLTINVQHT YDR.EKKLVE
Bommotreha	NAWPPEVSIV	VTAIQNIQSE	ESSKLAKELA	QVWVRACKSG FTE.KKQMF
Tenmotreha	NAWPPMQSII	VMGLDKSGSY	RAKQLARELA	RRWVKANLIG FRQ.TGEMFE
Rabbitreha	NAWAPLQDLV	IRGLAKSPSA	RTQEVAFOLA	QNWIRTNFDV YSQ.RSAMYE
Potatotreha	NGWPPLQHII	IEGLLRSGLE	EARTLAKDIA	IRWLRTNYVT YKK.TGAMYE
Yeasttreha	FGWAPHQILA	WEGLRSYGYL	...TVTNRLA	YRWLFMMTKA FVDYNGIVVE
	651			700
Ecoli2treh	KYHIADGVPR	EGGGGEYPLQ	.....D	GFGWTNG... VVRRLLIGLYG
Ecolitreha	KYDVSTTGT.	GGGGGEYPLQ	.....D	GFGWTNG... VTLKMLDLIC
Bommotreha	KYDALNAGKY	.GGGGEYTVQ	.....D	GFGWSNG... VVLEFLDRYG
Tenmotreha	KYNVEVPGON	.GGGGEYVVQ	.....S	GFGWTNG... VVLEFINQFF
Rabbitreha	KYDISNA.QP	.GGGGEYEVQ	.....E	GFGWTNG... VALMLLDLYG
Potatotreha	KYDVTKCGAY	.GGGGEYMSQ	.....T	GFGWSNG... VVLALLEEFG
Yeasttreha	KYDVTRGTD	HRVEAEYGNQ	GADFKGAATE	GFGWVNARYI LGLKYMNSYE
	701			732
Ecoli2treh	EP.....	.....	.....	..
Ecolitreha	PKEQPCDNVP	ATRPTVKSAT	TQPSTKEAQP	TP
Bommotreha	AVLTSVDSVD	ASANNGQSNE	ESETDSKEK.	..
Tenmotreha	TT.....	.....	.....	..

FIG. 4C



Trehalose activity in tobacco leaves transgenic
for a potato trehalose cDNA

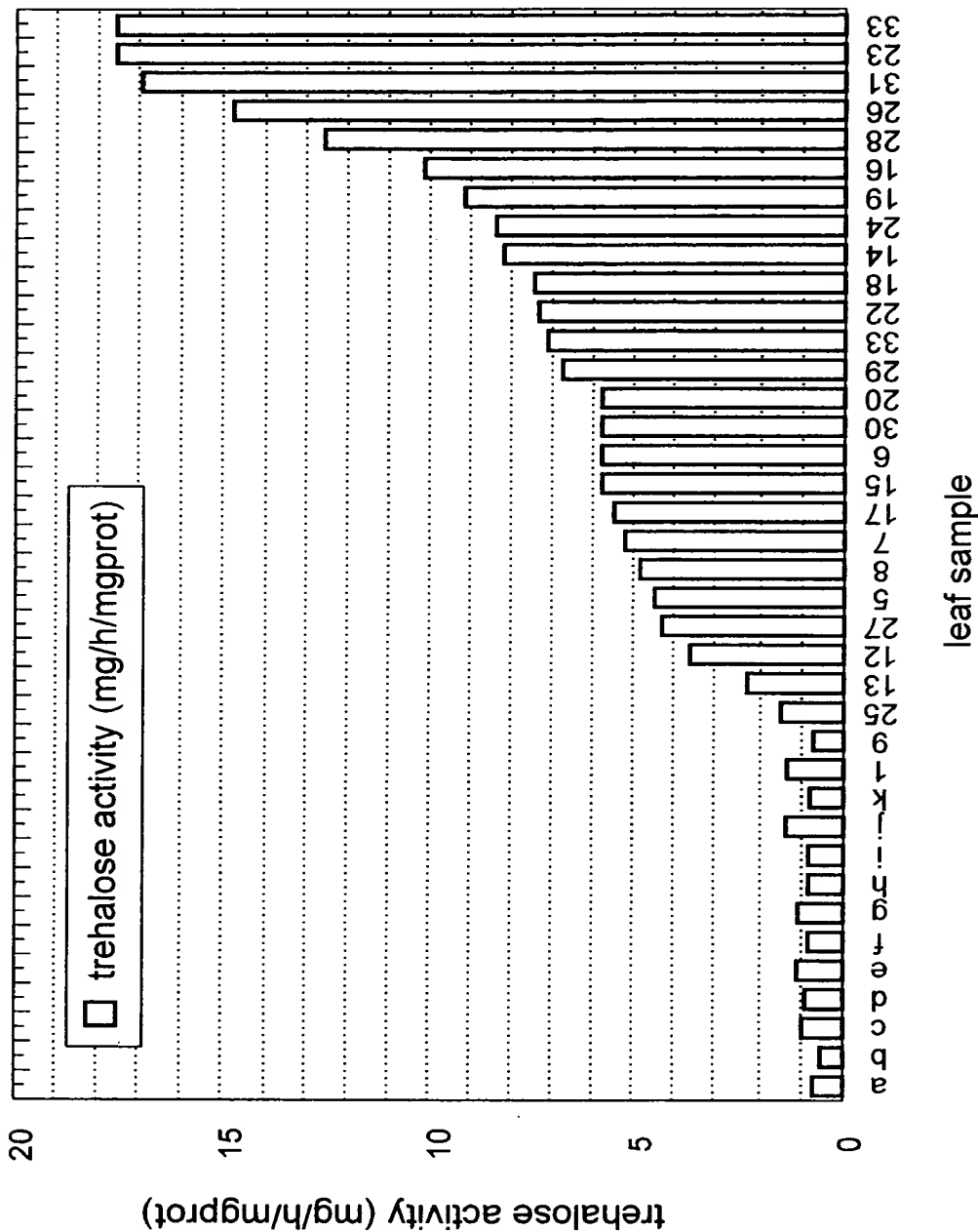


FIG. 5



Trehalose accumulation in microtubes

trehalose
mg.g⁻¹ fresh weight

pMOG1027 (845-11)		pMOG1027 (845-22)		pMOG1027 (845-28)	
9a	0.08	7a	0.02	3a	0.04
9b	0.21	7b	0.01	3b	0.15
11a	0.01	9a	0.02	15a	0.4
11b	0	9b	0.02	15b	ND
...		12a	0.09	18a	0
...		12b	0	18b	0.2
...		15a	0	26a	0.12
...		15b	0.01	26b	0.22
...		32a	0.01	27a	0.02
...		32b	0	27b	0.01
...		34a	0.01	31a	0.2
...		34b	0.01	31b	0.1
...		36a	0.01	34a	0.48
...		36b	0	34b	0.75
				38a	0.08
				38b	0.12
N= 25		N= 30		N= 29	

FIG. 6